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DECLARATION OF RICHARD J. GILBERT ON BEHALF OF SBC COMMUNICATIONS INC.

1. I am Richard J. Gilbert. I am Professor of Economics and Adjunct Professor of Business Administration at the University of California at Berkeley and a Director at Navigant Consulting/LECG, Inc., an international economics and strategic business consulting firm. My research specialty is in the field of industrial organization and regulation. From 1993 until 1995, I was the Deputy Assistant Attorney General for Economics in the Antitrust Division of the U.S. Department of Justice, the highest-ranking economics position in the Antitrust Division. In this capacity, I was involved in the Department's competitive analysis of the AT&T/McCaw merger, British Telecom's proposed equity investment in MCI, Deutsche Telekom's and France Telecom's proposed equity investment in Sprint, and other matters involving competition in the telecommunications industry.

2. I have been an Associate Editor of *The Journal of Economic Theory*, *The Journal of Industrial Economics*, and *The Review of Industrial Organization*. From 1994 to 1995, I was President of the Industrial Organization Society. From 1994 until May 1996, I was vice-chair of the American Bar Association's Antitrust Section committee on economics. I have published and lectured widely on industrial organization theory and policy and I have testified before U.S. courts of law, regulatory commissions, and Congress on economic policy issues. In 1995 I was invited to testify before the Federal Trade Commission on antitrust policy in high technology and other markets. I received Bachelors and Masters degrees in Electrical Engineering from Cornell University in 1966 and 1967, respectively. I received a Masters degree in Economics from Stanford

University in 1975, and a Ph.D. in Engineering-Economic Systems from Stanford University in 1976.

I. SUMMARY OF CONCLUSIONS

3. The merger of MCI WorldCom and Sprint would combine firms that are actual competitors in markets for telecommunications services, including long distance, data, and Internet backbone services.

- MCI WorldCom and Sprint are numbers 2 and 3 in the $100 billion market for voice long distance service with combined shares of 36 percent overall, and 44 percent in the business submarket;
- MCI WorldCom and Sprint are numbers 1 and 3 in the $8 billion market for public switched data services (such as X.25, Frame Relay, SMDS and ATM);
- MCI WorldCom and Sprint are numbers 1 and 2 in the market for Internet backbone service.
- MCI WorldCom and Sprint have nationwide brand recognition in long distance service.

4. Although the merger raises many competitive issues, I concentrate on the following specific areas related to this merger and the claims made by MCI WorldCom and Sprint in their FCC Application:

- Public Switched Data. I show that the level of market concentration in public switched data services is at least as large as the level of concentration in long distance voice, and that the proposed merger would increase concentration for data services to a degree that is likely to produce anticompetitive effects.
- Bundled Services. The proposed merger would eliminate a firm with strong brand recognition as a provider of bundled services to both business and mass-market customers.
- Efficiencies. The efficiencies claimed by the Applicants in this merger are small relative to the potential for anti-competitive effects. Moreover, a large share of the cost savings are not reductions in marginal cost, but instead are reductions in fixed overhead costs that are less likely to generate pro-competitive effects on prices in the near term.

II. THE PROPOSED MERGER WOULD ADVERSELY AFFECT THE MARKET FOR PUBLIC SWITCHED DATA SERVICES

A. Public Switched Data Service is a Distinct Market

5. Computer-to-computer connectivity that is performed by direct connections or by way of a private network (such as a LAN) that is installed by the user or leased from a service provider may be termed a "data service." The private-line connections or even the entire private network can be replaced by a fast-packetized or cell-based service that uses a public network to switch and transport the data with known quality-of-service parameters. These services collectively are called "public switched data services" to distinguish them from simple interconnectivity or private networks. The services are also referred to as "packet-switched data services" to distinguish them from the circuit-switched voice telephone networks.

6. A packet-switched data network transmits data by breaking the data into small bits (or packets) and, unlike the dedicated circuit-switched networks common to voice transmission, allows individual packets to be routed from origin to destination independently. Packet-switched data services consist of several types of protocols and hardware, including Frame Relay, X.25, Asynchronous Transfer Mode (or ATM), and Switched Megabit Data Service (SMDS). Each of these consists of mechanisms to transfer data between locations. While these types of packet-switched data protocols may be substitutes for some data applications, all of these services are distinct from the type provided by circuit-switched voice service.

7. In the event of a hypothetical significant and non-transitory increase in the prices of packet-switched data services, a user of such services could not switch to circuit-switched services as a substitute because the lower speeds offered by circuit-switched

services would not be able to handle the quantities of data typically seen in packet-switched data applications. Instead, the most likely substitute for some of the services is a private-line data service. But even the private line has qualitative differences such as route diversity that makes it a poor substitute for the enhanced services discussed above. As a consequence, from an economic perspective, switched data services such as Frame Relay, X.25, ATM, and SMDS form a relevant market for merger analysis.

8. The FCC in its order on the MCI WorldCom merger independently arrived at the same conclusion by rejecting the contention that circuit- and packet-switched services, and Internet backbone are part of the same relevant market because of a certain fungibility between transmission facilities.[1]

B. The Proposed Merger Would Substantially Increase Concentration in the Already-Concentrated Public Switched Data Services Market

9. MCI WorldCom and Sprint, along with AT&T, are the top three providers of each of the public-switched data services. These three companies account for about 75 percent of overall Frame Relay revenues, and about 90 percent of the interLATA Frame Relay revenues.[2] The Big 3 account for about 77 percent of overall ATM revenues and 98 percent of the interLATA ATM revenues. In 2000, revenues for Frame Relay are expected to be about $6 billion, and revenues for ATM are expected to be about $800 million.[3]

10. BOCs cannot provide in-region interLATA data service, such as Frame Relay, in a particular state until a Section 271 application is approved by the FCC. Moreover,

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[1] FCC, MCI WorldCom Memorandum Order and Opinion, CC Docket No. 97-211, September 14, 1998, ¶ 148.

[2] Frost & Sullivan, "US ATM, Frame Relay, SMDS, and X.25 Public Data Services Market," Report Number 2687-63, various pages.

multi-state businesses are not likely to shift their interLATA data traffic to a BOC until that BOC has the legal ability to provide interLATA data services in all states in which those businesses are located. Businesses with locations in Texas, California, and Illinois, for example, are unlikely to shift their interstate interLATA data traffic to SBC until SBC has the ability to offer interLATA services in each of those states. Of course, the more states in which a business is located, the longer it is likely to take for those BOCs to be able to successfully compete for interLATA data traffic as facilities-based suppliers.

11. According to my calculations based on share and revenue figures contained in the Frost & Sullivan report on public switched data services,[4] in 1998 AT&T had a market share of about 24 percent, MCI Worldcom had about 30 percent, and Sprint had a market share of about 22 percent. The BOCs in total (including GTE) account for about 15 percent of the market. From the Frost & Sullivan data, I compute a pre-merger HHI to be 2013. Post-merger, the HHI would increase by 1294 points to 3307. The substantial increase in concentration from the merger would likely result in increased market power for the two remaining national firms and lead to higher prices for packet-switched data for business, government, and academic (university) customers who use these services. Furthermore, the large increase in concentration cannot be overcome by competitors with voice facilities moving into the data market without significant sunk investments in data switches.

[3] Frost & Sullivan, "US ATM, Frame Relay, SMDS, and X.25 Public Data Services Market," Report Number 2687-63, pp. 6-10 and 8-10.

[4] Frost & Sullivan, "US ATM, Frame Relay, SMDS, and X.25 Public Data Services Market," Report Number 2687-63. The total market for public switched data services is defined herein as the combined interLATA and intraLATA Frame Relay, X.25, ATM, and SMDS services.

III. THE PROPOSED MERGER ELIMINATES ONE OF THE FEW FIRMS ABLE TO PROVIDE COMPREHENSIVE BUNDLED SERVICES

A. The Existence of Bundled Product Offerings Does Not Equate to the Development of an "All Distance Market"

12. The Applicants claim that telecommunications services are moving away from the traditional distinction between long distance, local, and data services, and towards a so-called "all distance market."[5] The parties are unspecific about what they mean by a so-called "all distance market" and there are two plausible interpretations. One is that they mean a bundled service offering, such as a single package that includes local, long distance, and data services, obtained from a single provider with a single bill covering all of the services. The services that comprise the bundle may be priced separately. A second possibility is that they mean an offering in which there is a single price for all services in the bundle. For instance, it could mean that a customer pays the same per minute charge whether the call is local or long distance.

13. A bundling of separate services into a single offering does not eliminate markets for the individual components in the bundle. For example, if a supermarket chose to offer a package of beef and potatoes for a single price per pound, that would not obviate the fact that the two are part of distinct product markets and could be purchased separately. Long distance and other telecommunications services are likely to be available as separate service offerings for a significant time. There is not likely to be a separate so-called "all distance market" as long as consumers have an incentive to mix and match individual service offerings in response to a hypothetical increase in the price of a so-called "all distance" offering. Given current price levels, this incentive to mix and match is likely to persist for some time.

14. Even if AT&T and MCI WorldCom/Sprint develop offerings in which local and long distance services are offered at uniform prices, separate long distance and local offerings are likely to persist. Thus, while bundled services may be offered and priced in the ways described above by some carriers, they will not replace local and long distance as separate markets for competition analysis anytime soon.

B. The Merger Would Eliminate One of the Preferred Bundlers for Possible Mass Market Services

15. A 1999 consumer survey by the International Data Corporation, an independent research organization, found that the mass-market customer would prefer some type of bundled telecom service in the sense of obtaining more than one service from a single supplier: [6]

- About 74 percent of respondents desired local and long distance service in a telecommunications bundle;
- About 62 percent of respondents desired "all" telecom services in a telecom bundle;
- About 55 percent of respondents desired local, long distance, and Internet services in a telecom bundle;
- Almost the same number, 50 percent, desired just long distance and Internet services in a bundle; and
- About 28 percent of the respondents, the lowest number in the poll, desired no bundling at all.[7]

16. Thus, mass-market customers are quite interested in bundles, but they are somewhat open as to what might be contained in those bundles. The survey shows that a

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[5] MCI Worldcom Application to the FCC for Transfer of Sprint Licenses, pp. 9-21.

[6] Kiersted, T. "Putting it All Together: Which Consumers Want What Telecommunications Bundles," International Data Corporation, 1999, p. 2.

[7] *Ibid*, p. 14. IDC's survey considered "all" to mean local, long distance, Internet, cable television, wireless, and paging.

bundle with local and long distance is rather highly desired, as is a bundle with "all" services.

17. Internet service can be used to identify consumers that have a higher awareness of telecom services generally, as well as being higher-value customers. IDC's survey shows that, overall, mass-market respondents are approximately evenly divided on whether they would rather have their Internet service bundled with local and long distance (55%), only local (53%), or only long distance (49%). In other words, about half of the respondents want their Internet bundled with another telecom service, but they seem to be indifferent as to whether the other service is local, long distance, or both.

18. Although many firms can bundle individual service offerings, a smaller number can provide a bundle of services that are coordinated at a technical level. Moreover, according to IDC's research, Sprint and MCI WorldCom are the two most preferred sources for bundled services. MCI WorldCom and Sprint rank numbers 1 and 2 in the minds of consumers who would seek to purchase a bundle of Internet, local, and long distance service (with 65.1 percent and 63.4 percent respectively, versus the industry-wide average of 55.3 percent).[8] Moreover, as found by Carlton and Sider and by Hausman using separate data, those who purchase long distance service from Sprint regard MCI WorldCom as the next-closest substitute, at least in long distance.[9] Given the importance placed on long distance among consumers that prefer bundled services, it is

[8] *Ibid*, p. 38.
[9] Declaration of Dennis Carlton and Hal Sider, ¶¶ 32-38. See also Declaration of Professor Jerry A. Hausman on behalf of SBC at ¶¶ 21-22.

also likely that consumers of bundled services would consider MCI WorldCom and Sprint to be close substitutes as well.[10]

19. Accordingly, the merger would eliminate one of the more desirable providers with the ability to offer an Internet/local/long distance bundle or an Internet/long distance bundle. Further, to the extent that the merger results in higher prices in markets for any of the products that comprise bundled services, the merger will also result in higher prices for consumers of these bundles.

20. Finally, even if the Applicants are correct in their assessment that telecommunications will eventually be characterized by so-called "all distance" services, perhaps because of MCI Worldcom's and Sprint's ability to generate economies of scope that would result in the ability to charge a lower price for the bundle than for the products separately, the merger results in the loss of one of the more likely effective competitors in such a market.

IV. Efficiencies From the Merger Are Small Relative to the Potential for Competitive Harm

21. The overall cost savings are small relative to the potential anticompetitive consequences of the merger. Even if the merger resulted in only minimal increases in price, these increases could easily swamp the modest cost savings that the merging parties project. MCI WorldCom and Sprint estimate that cost savings in the first year of the merger will be around $2 billion, increasing to $4 billion by 2004.[11] The full $4

[10] A separate IDC study notes that Sprint and MCI WorldCom customers have a greater interest in bundled services that include Internet than AT&T customers and the population in general. "Generally, AT&T customers were less interested in bundles involving the Internet, and both MCI WorldCom and Sprint customers expressed markedly greater interest than the total population." Kiersted, T. "Battle of the Supergiants: How Do the Big Three Long Distance Carriers Rank?" International Data Corporation, 1999, p. 29.

[11] Affidavit of Rehberger and Grothe, ¶7.

billion in savings, not achieved until four years after the merger is finalized, represents 3.1 percent of the announced $129 billion value of the merger.[12]

22. This merger, if permitted, would represent a horizontal combination of actual competitors in the long distance market, in the public-switched data market, in the Internet backbone services market, and in a number of local exchange markets. The existing overlaps in these markets are substantial and the relative size of these firms in each of those markets is considerable as well:

- MCI WorldCom and Sprint are numbers 2 and 3 in the $100 billion long distance service with combined shares of 36 percent overall, and 44 percent in the business sub-market;
- MCI WorldCom and Sprint are numbers 1 and 2 in X.25,[13] numbers 2 and 3 in Frame Relay Services,[14] and numbers 1 and 2 in ATM Services,[15] which together comprise the $8 billion public switched data market; and
- MCI WorldCom and Sprint are likely numbers 1 and 2 in Internet backbone service.

23. The cost savings and synergies that these companies project would do little to offset the potential for anticompetitive effects from this merger. The DOJ/FTC *Merger Guidelines* state, "When the potential adverse competitive effect of the merger is likely to be large, extraordinarily great cognizable efficiencies would be necessary to prevent the merger from being anticompetitive."[16] There are surprisingly few merger-specific efficiencies claimed in the FCC Application, and those that are claimed do not, for the

[12] "MCI WorldCom and Sprint Create Pre-eminent Global Communications Company for 21st Century," Sprint-MCI WorldCom Press Release, October 5, 1999. <http://www.sprint.com/Stemp/press/releases/9910/9910050873.html> visited January 13, 2000.
[13] Frost & Sullivan, "US ATM, Frame Relay, SMDS, and X.25 Public Data Services Market," Report Number 2987-63, various pages.
[14] Frost & Sullivan, "US ATM, Frame Relay, SMDS, and X.25 Public Data Services Market," Report Number 2687-63, various pages.
[15] Frost & Sullivan, "US ATM, Frame Relay, SMDS, and X.25 Public Data Services Market," Report Number 2687-63, various pages.

most part, directly apply to markets where the merger is likely to cause significant competitive harm.

24. The proposed merger is likely to have substantial competitive impacts in several markets, including the Internet backbone market, the market for packet-switched data services, and in the long distance market. None of the claimed efficiencies that the merging parties list in their filings applies to the Internet backbone market or the packet-switched data market (with the possible exception of some share of the SG&A savings). In fact, the merging parties' filings note that the calculated cost savings apply only to long distance and wireless services.[17] Of the $2 billion in projected cost savings, $275 million (or 14 percent) are applicable directly to domestic long distance, and an additional $50 million (or less than 3 percent) are applicable directly to international long distance.[18]

25. If all the savings in the first year were passed on to long distance customers, that would represent $2 billion in savings. U.S. interLATA long distance revenues in 1998 were $95.3 billion.[19] Thus, a price increase (or a lack of a price decrease) of about 2 percent on all long distance would completely offset all of the savings that the Applicants claim for their proposed merger.[20] Professor Hausman's analysis indicates that after the merger, MCI WorldCom's prices would increase by 5.4 percent and Sprint's by 8.9 percent, which is consistent with the large increase in concentration from the merger.[21] It

[16] DOJ/FTC, Horizontal Merger Guidelines, § 4, revised April 8, 1997.
[17] MCI WorldCom Application to the FCC for Transfer of Sprint Licenses, p. 107.
[18] Rehberger and Grothe Affidavit, ¶¶ 8-10.
[19] Frost & Sullivan, "North American Long Distance Service and Reseller Markets," Report # 2737-63, 1999, p. 1-4.
[20] This assumes an inelastic demand curve. With a less than perfectly inelastic demand curve, consumers are also harmed through a reduction in the quantity of telecommunications services that they purchase at higher prices.
[21] Declaration of Professor Jerry A. Hausman, ¶ 24.

is also likely that AT&T would raise its prices in response to price increases by the merged MCI WorldCom/Sprint. Thus, it seems likely that the loss from long distance price increases would easily outweigh the modest $2 billion in first-year cost savings.

26. Even more, none of these efficiencies and cost savings applies to Internet backbone markets or packet-switched data markets. Thus, there are no offsetting cost reductions or other efficiencies to offset the anticompetitive effects and potential price increases that result from the merger in these markets.[22]

27. The largest portion of cost savings claimed by MCI WorldCom and Sprint is the $1.3 billion saving in SG&A. These savings result from savings in corporate overhead in areas such as finance, accounting, government regulation, and other areas. SG&A savings represent 65 percent of the projected first year cost savings of $2 billion. Thus, the bulk of projected cost savings comes largely from fixed costs and not from reductions in marginal costs, at least in the short to medium term. The FCC has stated in past opinions that such savings should not be given the same weight as reductions in marginal cost, especially when determining whether cost savings will result in a more competitive market.[23]

28. Past FCC opinions also emphasized the importance of lower marginal costs in reducing the incentives for coordinated interaction.[24] The relatively small reductions in marginal costs projected by the parties to the proposed merger will do little to offset the

[22] See DOJ/FTC, Horizontal Merger Guidelines, § 4, revised April 9, 1997, ("the Agency considers whether cognizable efficiencies likely would be sufficient to reverse the merger's potential harm to consumers in the relevant market, e.g., by preventing price increases in that market").

[23] FCC, Bell Atlantic/Nynex Memorandum Order and Opinion, ¶¶ 169-170. See also DOJ/FTC, Horizontal Merger Guidelines, §4, revised April 8, 1997.

[24] "Merger generated efficiencies can also make coordinated interaction less likely or effective if those efficiencies are reductions in marginal costs that make coordination less likely or effective by enhancing the incentive of a maverick firm to lower price or by creating a new maverick firm." See Bell Atlantic/NYNEX Memorandum Opinion and Order, ¶ 169.

enhanced incentive for coordination between the two remaining brand name national providers.

29. One of the primary synergies that MCI WorldCom and Sprint emphasize is the claim that the merger would allow the combined firm to enter local markets more effectively than either firm could on its own.[25] This claim rests on the ability of the combined firm to more effectively develop and roll-out wireless broadband (MMDS) services than either company could on its own.[26] They claim that a broader, even national, footprint of MMDS facilities is necessary to achieve economies of scale and other efficiencies from common ownership.

30. An established principle in merger analysis, both in the *Merger Guidelines*, and in previous FCC opinions is that, while merger efficiencies are often difficult to verify, reviewers and regulators must be provided enough information to determine the legitimacy of the parties' claims. "[T]he merging firms must substantiate efficiency claims so that the Agency can verify by reasonable means the likelihood and magnitude of each asserted efficiency, how and when each would be achieved (and any costs of doing so), how each would enhance the merged firm's ability and incentive to compete..."[27] The *Merger Guidelines* further state that, "Efficiency claims will not be considered if they are vague or speculative, or otherwise cannot be verified by reasonable means."[28] The Applicants' alleged merger efficiencies related to MMDS fail to meet these requirements.

[25] Declaration of Daniel Kelley and Robert Mercer, ¶¶ 62-64.

[26] *Ibid*, ¶¶ 62-67, MCI WorldCom Application to the FCC for Transfer of Sprint Licenses, pp. 102-103.

[27] DOJ/FTC, Horizontal Merger Guidelines, § 4, revised April 8, 1997.

[28] *Ibid.*

31. There is no discussion by the Applicants of a timetable for when some of the product synergies, such as MMDS, can be implemented. Furthermore, there is little documentation of how the efficiencies arise and what impact these efficiencies will have on the relevant markets. The Applicants claim that there are numerous synergies in the development of MMDS technologies, in simplified contracting, in geographic coverage, and in bandwidth that arise from the merger.[29] Yet they do not provide concrete examples of where and how these synergies would arise.

32. A further reason to discount claimed efficiencies related to MMDS is that both Sprint and MCI WorldCom were already pursuing separate MMDS strategies at the time the merger was announced, including the acquisition of spectrum in numerous markets. Thus, the Applicants cannot claim that the sunk costs of MMDS roll-out are so large that neither firm could do it on its own. MCI WorldCom and Sprint collectively spent over $1 billion to purchase MMDS frequencies and other assets prior to the merger.[30] Prior to the merger, Sprint had plans to roll out broadband using its MMDS spectrum early in 2000.[31] Industry analysts noted that MCI WorldCom and Sprint were collecting MMDS spectrum as a way to solve the last mile problem in their attempts to bypass ILECs for local access.[32]

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[29] FCC Application pp. 85-92.

[30] Broadband Today, A Staff Report to William Kennard, by Deborah A. Lathen, October 1999, p. 29.

[31] In a recent acquisition of an MMDS company, Sprint announced that it "[W]ill immediately begin designing and building a fixed wireless network capable of delivering a variety of broadband services to residences and small businesses...[e]arly in the year 2000..." This is according to the President of Sprint's Broadband Wireless Group, quoted in a Sprint press release, "Sprint Closes Acquisition of American Telecasting, Inc," Kansas City, MO, September 23, 1999, <http:\\www3.sprint.com\Stemp\press\release\199909\199909230866.html> (visited January 13, 2000).

[32] "MMDS systems complement these long distance carriers' (IXC) networks, for they provide the last-mile connection to businesses and residences. Once the networks of MMDS and IXCs become fully integrated, the IXCs will have greater control of the end-to-end transmission..." Broadband Today, p. 30.

33. In short, there is no guarantee that this efficiency will materialize, and even if it does, that its impact would be substantial given the rapid movement in the marketplace and the development of other technologies. When weighing this against the loss of an active actual MMDS competitor and the loss of a potential local exchange competitor that results from the merger, the claimed efficiencies in MMDS deployment do not overcome the potential for competitive harm that results from the merger.

V. CONCLUSION

34. The merger between MCI WorldCom and Sprint presents competitive concerns in a number of different areas. I reviewed three areas of potential concern related to the merger. First, I reviewed the impact of the merger in the market for packet-switched data services, such as Frame Relay and ATM. MCI WorldCom and Sprint are two of the three largest competitors in this market. I find that the merger results in a substantial increase in concentration. If this merger were approved, it would increase the HHI in this market by 1294 points, from 2013 to 3307.

35. Second, I reviewed the parties' claim of a developing so-called "all distance market." I conclude that the concept of an "all distance market" is not presently consistent with standard market definition concepts in competition analysis. However, even if the parties are correct that there is a developing market for bundled services, the merger would eliminate one of the most widely recognized brand name competitors in such a market. Further, whether or not such a market exists, the merger will result in higher prices for bundled services.

36. Finally, I reviewed the parties' efficiencies claims. I find that the claimed efficiencies are small relative to the potential for anticompetitive harm that could result

from the merger and have not been clearly documented by the parties as being specific to the merger.

I declare, under penalty of perjury, the foregoing to be true and correct to the best of my knowledge and belief.

Date: February 18, 2000

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Visiting Fellow, Nuffield College, University of Oxford, 1979

Fulbright Scholar, South America, 1989

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PROFESSIONAL ACTIVITIES

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Associate Editor, *Journal of Sports Economics*, 1999-

Associate Editor, *Journal of Economic Theory*, 1983-1989

Associate Editor, *Journal of Industrial Economics*, 1990-1993

Associate Editor, *Review of Industrial Organization*, 1990-1993

Vice-Chair, American Bar Association Antitrust Economics Committee, 1993-1995

Co-Director, Program on Workable Energy Regulation, 1990-1993

Review Panel, National Science Foundation, Economics Program, 1985

Review Panel, National Science Foundation, Regulation Program, 1985-1986

Advisor to U.S. Department of Energy, Energy Assessment Panel on Energy Security, 1992

Member of Advisory Board, California Institute for Energy Efficiency, 1992-1993

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Conference Organizer: European Summer Symposium in Economic Theory, Gerzensee, 1998; Post-Chicago Economics Conference, Washington, D.C., May 26-27, 1994; International Comparisons of Electricity Regulation, Toulouse, May 1993; Economics of Energy Conservation, Berkeley, June 1992; Telecommunications Policy Research Conference, 1988, 1989; Developments in Electricity Regulation, Berkeley, June 1987

Session Organizer: 1994 Meetings of the American Economic Association; 1987 Meetings of the Econometrics Society; 1984 Meetings of the American Economic Association; 1983 Meetings of ORSA/TIMS Associations

Nominating Committee Member, Industrial Organization Society Professional Service Award, 1998, 1999

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Member of American Economic Association, Econometric Society, Sigma Xi, Tau Beta Pi, Eta Kappa Nu.

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PUBLICATIONS

Articles

1) "An Economic Model of Rationing," with Paul Klemperer, forthcoming in the *Rand Journal of Economics*.
2) "Antitrust Policy for the Licensing of Intellectual Property: An International Comparison," forthcoming in the *International Journal of Technology Management.*
3) "Competition Policy," with Oliver Williamson, *The New Palgrave Dictionary of Law and Economics,* Macmillan, 1998.
4) "Antitrust Issues in the Licensing of Intellectual Property: The Nine No-No's Meet the Nineties," with Carl Shapiro, *Brookings Papers: Microeconomics*, 1997, pp. 283-336.
5) "Do Gasoline Prices Respond Asymmetrically to Crude Oil Price Changes?" with Severin Borenstein and A. Colin Cameron, *Quarterly Journal of Economics*, vol. 112, Issue 1, February 1997, pp. 305-339.

6) "An Economic Analysis of Unilateral Refusals to License Intellectual Property," with Carl Shapiro, *Proceedings of the National Academy of Sciences of the United States of America*, vol. 93, no. 23, November 12, 1996, pp. 12749-12755.

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9) "Regulating Complementary Products: A Comparative Institutional Analysis," with Michael Riordan, *Rand Journal of Economics*, vol. 26, no. 2, Summer, 1995, pp. 243-256.

10) "Incorporating Dynamic Efficiency Concerns in Merger Analysis: The Use of Innovation Markets," with Steven Sunshine, *Antitrust Law Journal*, vol. 63, no. 2, Winter 1995, pp. 569-602. Reprinted in Andrew I. Gavil (ed.), *An Antitrust Anthology*, Anderson Publishing, 1996.

11) "The Dynamic Efficiency of Regulatory Constitutions," with David Newbery, *Rand Journal of Economics*, vol. 25, no. 4, Winter, 1994, pp. 538-554.

12) "A Review and Analysis of Utility Conservation Incentive Programs," with Steven Stoft, *The Yale Journal on Regulation*, Winter, 1994, pp. 1-42.

13) "Coordination in the Wholesale Market: Where does it Work?" with Edward Kahn and Matthew White, *The Electricity Journal*, vol. 6, no. 8, October 1993, pp. 51-59.

14) "Uncle Sam at the Gas Pump: The Causes and Consequences of Gasoline Distribution Regulations," *Regulation*, vol. 16, no. 2, 1993, pp. 63-75.

15) "Product Line Rivalry with Brand Differentiation," with Carmen Matutes, *The Journal of Industrial Economics*, September, 1993, pp. 223-240.

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17) "Introduction to Symposium on Compatibility: Incentives and Market Structure," *The Journal of Industrial Economics*, March 1992, pp. 1-8.

18) "Legal and Economic Issues in the Commercialization of New Technology," *Journal of Institutional and Theoretical Economics*, March 1991, pp. 155-181.

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20) "Optimal Patent Length and Breadth," with C. Shapiro, *Rand Journal of Economics*, vol. 21, no. 1, Spring 1990, pp. 106-112.

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22) "Investment and Coordination in Oligopolistic Industries," with M. Lieberman, *Rand Journal of Economics*, vol. 18, no. 1, Spring 1987, pp. 17-33.

23) "Comment on Levin, R., A. Klevorick, R. Nelson, and S. Winter, 'Appropriating the Returns from Industrial Research and Development,'" *Brookings Papers on Economic Activity*, vol. 3, 1987, pp. 821-824.

24) "Investing Under Regulatory Uncertainty: What To Do When the Rules Change," with H. Chao and S. Peck, *Energy Systems and Policy*, vol. 9, no. 4, 1986, pp. 385-396.

25) "Efficient Pricing During Oil Supply Disruptions," with K. Mork, *Energy Journal*, vol. 7, no. 2, April 1986, pp. 51-68.

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Books

1) *International Comparisons of Electricity Regulation*, with Edward Kahn, Cambridge University Press, 1996.

2) *The Environment of Oil*, Kluwer Academic Press, 1993.

3) *Regulatory Choices: A Perspective on Developments in Energy Policy*, University of California Press, 1991.

4) *Strategic Competition and Barriers to Entry*, with P. Geroski and A. Jacquemin, in series vol. 41: Theory of the Firm and Industrial Organization, Lesourne, J. and H. Sonnenschein (eds.), *Fundamentals of Pure and Applied Economics*, Harwood Academic Press, 1990.

Chapters in Books

1) "Networks, Standards, and the Use of Market Dominance: Microsoft (1995)," forthcoming in Kwoka, J. and L. White (eds.), *The Antitrust Revolution: The Role of Economics*, 3rd edition, Oxford University Press.

2) "Unilateral Refusals to License Intellectual Property and International Competition Policy," in E. Hope and P. Maeleng (eds.), *Competition and Trade Policies: Coherence or Conflict?*, Routledge Press, London, 1998.

3) "The Efficiency of Market Coordination: Evidence from Wholesale Electric Power Pools," with Edward Kahn and Matthew White, in W. Sichel and D.L. Alexander (eds.), *Networks, Infrastructure, and the New Task for Regulation*, The University of Michigan Press, Ann Arbor, 1996.

4) "On the Delegation of Pricing Authority in Shared ATM Networks," in M. Guerin-Calvert and S. Wildman (eds.), *Electronic Services Networks: A Business and Public Policy Challenge*, Greenwood, Praeger Publishers, New York, 1991.

5) "Mobility Barriers and the Value of Incumbency," Chapter 8 in Schmalensee, R. and R. Willig (eds.), *Handbook of Industrial Organization*, North-Holland, 1989.

6) "Forecasting Technology Adoption with an Application to Telecommunications Bypass," with Jeffrey Rohlfs, in de Fontenay, A., M.H. Shugard and D.S. Sibley (eds.), *Telecommunications Demand Modelling: An Integrated View*, North-Holland, Amsterdam, 1990, pp. 399-412.

7) "Preemptive Competition," in G. F. Mathewson and J. Stiglitz (eds.), *New Directions in the Analysis of Market Structure*, MIT Press, Cambridge; Macmillan Press, London, 1986.

8) "Coping with Major Oil Disruptions," in J. Plummer, editor, *Energy Vulnerability*, Ballinger Press, 1982.

9) "Patents, Sleeping Patents, and Entry Deterrence," in S. Salop, editor, *Strategy, Predation, and Antitrust Analysis*, Federal Trade Commission, 1981.

10) "The Social and Private Value of Exploration Information," in J. Ramsey, editor, *Symposium on the Economics of Exploration for Energy Resources*, Greenwich CT: JAI Press, 1981.

11) "Search Strategies and Private Incentives for Resource Exploration," in R. Pindyck, (ed.), *Advances in the Economics of Energy and Resources*, vol. 2, JAI Press, 1979, pp. 149-169.

12) "The Economic Common Sense of Controlling Nuclear Power Development," with M. Boskin, *The California Nuclear Initiative*, Institute for Energy Studies, Stanford University, 1976; also published in *California Energy: The Economic Factors*, Federal Reserve Bank of San Francisco, 1976.

13) "A 1.1 GHz Scanned Acoustic Microscope," in *Acoustical Holography*, vol. 4, Plenum Press, 1972.

Working Papers

1) "Exclusive Dealing, Preferential Dealing, and Dynamic Efficiency."
2) "A Rent-Grabbing Theory of Tying," (with Michael Riordan).

INVITED LECTURES AND TESTIMONY (Since 1986)

"Technology, Antitrust, and the Presidency," The Presidency and Macroeconomic Policy Conference, Miller Center of Public Affairs, University of Virginia, October 16, 1999.

"A Rent-Grabbing Theory of Tying," Fifth Annual Berkeley-Stanford Conference in Industrial Organization, University of California, October 9, 1999.

"Antitrust Policy in a Small Open Economy," Tel Aviv University, May 27, 1999.

"Exclusive Dealing, Preferential Dealing, and Dynamic Efficiency," Conference on Antitrust and Regulation, Tel Aviv University, May 26, 1999.

"Merger Reviews in the Telecommunications and Media Industries," Annual Spring Meeting of the ABA Section of Antitrust Law, Washington, D.C., April 14, 1999.

"Defining the Boundary Between Legitimate Cooperation and Illegal Collusion," The Conference Board 1999 Antitrust Conference, New York, N.Y., March 4, 1999.

"The Intersection of Antitrust and Intellectual Property," Conference on Antitrust Issues in High-Tech Industries, Scottsdale, AZ, February 26, 1999.

"Economic Analysis of Antitrust Rules and Intellectual Property," Conference on Antitrust in the High-Tech Industry, Menlo Park, CA, February 23, 1999.

"Economic Factors in the Production, Dissemination, and Use of Scientific Databases," National Research Council Workshop on Promoting Access to Scientific and Technical Data for the Public Interest," Washington, D.C., January 14-15, 1999.

"Exclusive Dealing, Preferential Dealing, and Dynamic Efficiency," 25th Anniversary Seminar of the Economic Policy Office/Economic Analysis Group, Antitrust Division, U.S. Department of Justice, Washington, D.C., November 6, 1998.

"The Microsoft Case: Antitrust for the 21st Century?" San Diego Business Round Table, San Diego, CA, October 23, 1998.

"Exclusive Dealing and Antitrust Policy," Department of Economics, University of California at San Diego, San Diego, CA, October 22, 1998.

"Antitrust Policy for the Computer Industry," Microprocessor Forum, San Jose, CA, October 14, 1998.

"Incorporating Economic Principles in Intellectual Property Damages," conference on The Economic Analysis of Intellectual Property Damages, San Francisco, CA, October 2, 1998.

"Antitrust Issues in the Licensing of Intellectual Property," (paper presentation and roundtable discussion leader), European Summer Symposium in Economic Theory, Gerzensee, Switzerland, June 29-July 4, 1998.

"Antitrust Issues in the Licensing of Intellectual Property: Microsoft Meets Contract Theory," (paper presentation and roundtable discussion leader), Conference on Regulation and Competition in Network Industries, June 5-6, Barcelona, Spain.

"Antitrust in High Technology Markets," speech before the Peninsula Intellectual Property Law Association, Palo Alto, CA, March 24, 1998.

Session Moderator on the Current Regulatory Environment, Conference on Telecommunications Incentives to Invest in Advanced Infrastructure, University of California at Berkeley, March 20, 1998.

"Identifying Limits on Relations Among Rivals," presented at the Conference Board 1998 Antitrust Conference, New York, NY, March 5, 1998.

"The DOJ/FTC Antitrust Guidelines for the Licensing of Intellectual Property," invited lecture, Boalt School of Law, University of California at Berkeley, February 4, 1998.

"Antitrust in High Technology Markets," speech before the Intellectual Property Institute, San Francisco, CA, January 26, 1998.

"Comments on the Antitrust Treatment of Joint Ventures," invited participant in Federal Trade Commission Roundtable on per se illegality and rule of reason analysis of joint ventures, Washington D.C., December 12, 1997.

"Standards for Evaluating Market Power in Electricity," California ISO Market Power and Monitoring Workshop, Oakland, CA, November 18, 1997.

"Antitrust Issues in the Licensing of Intellectual Property," invited lecture, Boalt School of Law, University of California at Berkeley, November 13, 1997.

"Antitrust Issues and the Licensing of Intellectual Property," Third Annual Berkeley-Stanford Conference in Industrial Organization, Berkeley, CA, October 18, 1997.

"The Microsoft Antitrust Wars," invited lecture, Public Policy School, University of California at Berkeley, October 14, 1977.

"Electricity Merger Analysis: Does the FERC Follow the Merger Guidelines?" IAEE Annual Conference, San Francisco, CA, September 8, 1997.

"Networks and Bottlenecks," conference on Bridging Digital Technologies and Regulatory Paradigms, University of California at Berkeley, June 27, 1997.

"Unilateral Effects Analysis: Vertical Competition Issues in Telecommunications," conference on Competition Policy in Communications Industries: New Antitrust Approaches, Washington, D.C., March 10-11, 1997.

"Can Electricity Markets Be Competitive?" conference on Market Power and Competition in Electricity, Washington, D.C., February 27-28, 1997.

"An Economic Analysis of Unilateral Refusals to License Intellectual Property," New York University School of Law, February 6, 1997.

"Competition Policy in the High-Tech, Global Marketplace," Meeting of the American Economics Association, New Orleans, January 5, 1997.

"The Role of the State Public Utilities Regulatory Commission in Competition Policy," remarks before the Staff Subcommittee for NARUC on Strategic Issues, San Francisco, November 18, 1996.

"Economic Issues Copyright Protection: the Lotus v. Borland Case," National Bureau of Economic Research Summer Institute, Cambridge, MA, July 23, 1996.

"Unilateral Refusals to License Intellectual Property and International Competition Policy," conference on "Competition Policies for an Integrated World Economy," Oslo, Norway, June 14, 1996.

"Applying the Merger Guidelines to Electricity Mergers," Conference of Public Utility Counsel, San Francisco, CA, May 17, 1996.

"The US DOJ/FTC Intellectual Property Guidelines," invited address at the conference on "Competition Policy, Intellectual Property Rights, and International Economic Integration," Ottawa, Canada, May 12, 1996.

"Competition Issues Related to Software Patents," Berkeley Roundtable on Software Innovation, Berkeley, CA, April 26, 1996.

Moderator, "Panel on *Image Technical Services v. Eastman Kodak*," San Francisco Bar Association, San Francisco, CA, April 26, 1996.

"Economic Perspectives on Compulsory Licensing of Intellectual Property," American Bar Association Spring Antitrust Meeting, March 27, 1996, Washington, D.C.

Panel Discussant, "The 1995 Guidelines for the Licensing of Intellectual Property," High Technology Section of the Santa Clara Bar Association, Santa Clara, CA, February 7, 1996.

"Microeconomic Analysis in Government Policy," American Economic Association Annual Meeting, San Francisco, CA, January 5, 1996.

"Analysis of Market Power in the Computer Industry," Chinese Government Official Training Program, Biltmore Hotel, Santa Clara, CA, December 8, 1995.

"Antitrust Evaluation of Electric Utility Mergers," The Third DOE-NARUC National Electricity Forum, Washington, D.C., December 5, 1995.

"Responding to Structural Change: A Call for a Review of the Competitive Consequences of Hospital Mergers," en banc testimony before the Federal Trade Commission Hearings on Global and Innovation-Based Competition, Washington, D.C., November 14, 1995.

"Economic Perspectives on Compulsory Licensing of Intellectual Property," presented at the 3rd Annual Golden State Antitrust and Trade Regulation Institute, San Francisco, CA, October 27, 1995.

"Comments on the Use and Misuse of Innovation Market Analysis," en banc testimony before the Federal Trade Commission Hearings on Global and Innovation-Based Competition, Washington, D.C., October 25, 1995.

"An Economic Analysis of Unilateral Refusals to License Intellectual Property," presented at the National Academy of Sciences Colloquium on Science, Technology and the Economy, Irvine, CA, October 20-22, 1995.

"Discussion of 'Restructuring and Regulatory Reform in Network Industries; from Hierarchies to Markets'," by Paul Joskow, presented at the conference on Firms, Markets and Hierarchies, Berkeley, CA, October 6-8, 1995.

"Compulsory Licensing: Practical Facts and Economic Musings," American Bar Association Section of Antitrust Law, Annual Meeting, Chicago, IL, August 8, 1995. Also presented at Intellectual Property Antitrust 1995, Practising Law Institute, San Francisco, CA, July 20, 1995.

"Joint Venture Access Rules: An Antitrust Evaluation," American Bar Association Section of Antitrust Law, Annual Meeting, Chicago, IL, August 7, 1995.

"Competition in Electric Power Generation: Market Power and Market Pricing," Harvard Electricity Policy Group, Cambridge, MA, April 18, 1995.

"The 1995 Antitrust Guidelines for the Licensing of Intellectual Property: New Signposts for the Intersection of Intellectual Property and the Antitrust Laws," American Bar Association Section of Antitrust Law Spring Meeting, Washington, D.C., April 4, 1995. Also presented at The Aerospace Industries Association, Washington, D.C., April 20, 1995; The Fordham International Antitrust Conference, New York, NY, April 21, 1995.

"The Antitrust Agenda in the Clinton Administration," American Bar Association Business Law Section, March 24, 1995.

"The New Federal Antitrust Licensing Guidelines: The Music Behind the Words," Price Waterhouse Intellectual Property Conference, Tucson, AZ, February 23, 1995.

"Intellectual Property and the Antitrust Laws: Protecting Innovators and Innovation," Annual Winter Meeting of the Licensing Executives Society, Phoenix, AZ, February 17, 1995. Also presented at The Conference Board, New York, NY, March 2, 1995; The Antitrust '95 Conference, Washington, D.C., March 15, 1995.

"Traditional Antitrust for Non-Traditional Markets: The Case of High-Tech and Intellectual Property," American Bar Association Conference, Washington, D.C., November 17, 1994.

Interview in *Competition*, The Journal of the Antitrust and Trade Regulation Law Section of the State Bar of California, Vol. 4, No. 2, Fall 1994.

"The Antitrust Division Guidelines for Intellectual Property," Licensing Executives Society Annual Meeting, Crystal City, VA, September 12, 1994. Also presented at the Federal Bar Association, Washington, D.C., September 13, 1994; The Golden State Antitrust and Trade Regulation Institute, Los Angeles, CA, October 6, 1994; The Antitrust Conference, Washington, D.C, October 12, 1994; The American Intellectual Property Law Association, Washington, D.C., October 28, 1994; The Intellectual Property Owners Association, Washington, D.C., December 5, 1994; The New York State Bar Association, New York, NY, January 26, 1995.

"The Antitrust Division 1994 Intellectual Property Guidelines," ABA Antitrust Section, Amelia Island, FL, August 11, 1994.

"Emerging Issues in Intellectual Property Antitrust: Recent Antitrust Division Guidelines for Intellectual Property," ABA Annual Meeting, Antitrust Section, New Orleans, LA, August 9, 1994.

"Antitrust Issues Confronting High-Technology Companies in a Converging Industries Information Age: Mergers, Joint Ventures, Strategic Alliances," ABA Annual Meeting, Antitrust Section, New Orleans, LA, August 8, 1994.

"The Clinton Administration's Views on the Application of the Antitrust Laws to Intellectual Property, Technology Exploitation, and Innovation," Practising Law Institute, San Francisco, CA, July 15, 1994.

"Antitrust Policy in High Technology Markets: A View from the Antitrust Division," D.C. Bar Trade Regulation and Intellectual Property Committees, Washington, D.C., June 15, 1994; also presented at the D.C. Bar Association's Patent, Trademark, Copyright Section Annual Luncheon, Washington, D.C., June 21, 1994.

"The Use of Innovation Markets in Merger Analysis," Conference on Post-Chicago Economics, Washington, D.C., May 26, 1994.

"Antitrust and Regional Electricity Transmission Groups," Program on Workable Energy Regulation Annual Conference, Oakland, CA, May 19, 1994.

"The Antitrust Division Intellectual Property Task Force," American Intellectual Property Law Association, Cleveland, OH, April 22, 1994.

"Antitrust Issues in Patent Infringement Litigation: The Antitrust Counterattack," ABA Section of Antitrust Law 42nd Annual Spring Meeting, Washington, D.C., April 7, 1994.

"The Licensing of Intellectual Property," presented at San Francisco Patent and Trademark Law Association, San Francisco, CA, March 19, 1994.

"Intellectual Property," Law & Technology Seminar Workshop, Boalt School of Law, University of California, Berkeley, CA, March 16, 1994.

Statement submitted to the Subcommittee on Patents, Copyrights and Trademarks, Committee of the Judiciary, United States Senate, Concerning the Patent Term Publication Reform Act of 1994, March 9, 1994.

"Product Distribution Arrangements: Legal and Economic Issues," The Conference Board, New York, NY, March 3, 1994.

"Intellectual Property Licensing Issues: A View from the Antitrust Division," Practising Law Institute, New York, NY, March 1, 1994; also presented at San Francisco, CA, April 8, 1994.

"Mergers in High Technology Industries," presented at the Antitrust Practice Group, San Francisco, CA, February 4, 1994.

"Antitrust Policy in High Technology Markets," presented at the Conference of the Association of American Law Schools, Orlando, FL, January 7, 1994.

"An Equilibrium Theory of Rationing," presented at the Federal Trade Commission, Washington, D.C., November 17, 1993.

"Electric Power Regulatory Developments in the U.S.," presented at the POWER Conference on International Comparisons of Electricity Regulation, Toulouse, May 1993.

"A Review and Analysis of Electric Utility Conservation Incentives," presented at the POWER Conference on the Economics of Energy Conservation, Berkeley, June 1992.

"Asymmetric Gasoline Price Responses to Crude Oil Price Changes," presented at the NBER Conference on Industrial Organization, Boston, December 6, 1991.

"Do We Need a National Energy Strategy?" invited comments before the Subcommittee on Economic Stabilization, Committee on Banking, Finance and Urban Affairs, U.S. House of Representatives, October 17, 1991.

"Developments in Electricity Regulation," presented at the Latin American Meetings of the Econometrics Society, Montevideo, Uruguay, August 28, 1991.

Comments on the outlook for petroleum prices, KPIX-TV, January 15, 1991.

Comments on the petroleum industry, Public Radio Broadcasting Network, September 3, 1990.

"Developments in Energy Regulation," Conference on Bidding for Electric Power, Davis, Ca, March 1990.

"Pricing Delegation in Shared ATM Networks," Annenberg Conference on Electronic Service Networks, February 1990.

"Outlook for Competition in Electric Power Markets," California Public Utility Commission, February 1990.

"Progress of Deregulation in the U.S.," Montevideo, Uruguay and Buenos Aires, Argentina, August 1989.

"Entry vs. Acquisition," Harvard University, March 1989; also presented at U.S. Department of Justice, October 1988.

"The Role of Potential Competition in Industrial Organization," invited lecture, Bank of San Paolo, Turin, Italy, June 1988.

"Competition in Electric Power Markets," Executive Seminar on Utility Regulation, University of California, Berkeley, June 1988.

"Multiproduct Competition," presented at University of California, April 1988. Also presented at Stanford University, May 1988, University of Florence, June 1988.

"Rate Reform in Competitive Electric Power Markets," presented at the Management Institute of Berlin, May 1987.

"Lectures in the Theory of Economic Regulation," presented at the Autonomous University of Barcelona, May 1987. Also presented at the Stockholm School of Economics, June 1987.

En Banc Testimony before the California Public Utilities Commission on revising rate-making mechanisms for electric utilities, March 1987.

"The Nuclear Industry After Chernobyl," University Explorer Series #860630, June 30, 1986.

BACKGROUND

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U.S. citizen

November 1999

CERTIFICATE OF SERVICE

I hereby certify that, on this 18th day of February 2000, I caused copies of the Opposition of SBC to be served upon the parties listed on the attached service list by hand delivery (indicated by asterisk) or by first-class mail, postage prepaid.

Sylena L. Slaughter

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